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Distributed Generation Workshops Docket No E00000A-99-0431

Distributed Generation Comments on Topics provided by the ACC

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2005 AUG - 1 P 2: 26

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The following comments, based on our evaluation of each of the documents listed below, are submitted for your review.

- Interconnection Requirements For Distributed Generation – Arizona Public Service Company 1999
- SRP Interconnection Guidelines For Distributed Generators December 2000
- Tucson Electric Power Co. Interconnection Requirements For Distributed Generation
- Distributed Generation Interconnection Manual – Public Utility Commission of Texas
- Small Generator Interconnection Procedures (SGIP) - FERC

Our comments focus on business decisions that must be made in order to enter into the DG industry in Arizona and are based on current needs while considering the future, the eventual deregulation of the electric utility industry, and the business opportunities and challenges that affect a business plan. Constructing a business plan based on current information is quite challenging. The industry is not transparent and facts must be uncovered in order to provide a financial strategy acceptable to the investment industry.

Comments are formatted using the "Topics for Comment" worksheet provided by the Commission. Additional comments follow the worksheet topics.

DG industry business development is still in its very early stage in Arizona. A 'phased' approach to DG installations must be outlined, and a central monitoring system for all generators and load centers (substations) in the State must be organized and implemented by the ACC. The monitoring for DG systems should include a GPS tracking system and also record the amount of electricity generated by each system.

In general, all documents furnished by the utilities provide an acceptable format from which to work. Regulation must be added to ensure the safety and reliability of the electric grid. All efforts must be made to apply no regulations that would negatively affect investor confidence in our current and future grid systems.

I. Scope and Procedure

A. Applicability

a. Size and type of facilities which the policy applies to

Because generating equipment could be installed in residential, commercial, industrial or rural zoning areas, the commission may want to consider attaching existing real estate zoning to the size and type of facilities. These zones would require different degrees of protection and documentation: residential would be restricted to certain types of generating facilities and less than 50 kW (Class I); commercial would be up to 5,000 kW (Class II & III) industrial could be any Class; rural zoning would require special review.

b. Categories of generator size or classes

The APS designations of size and class are proper – Class I, II, III, IV.

c. Distributed generation types

Any piece of equipment that generates **utility quality** electricity should be permitted as a DG system. All generators must comply with regulatory codes and standards and be certified by proper Underwriter Laboratories.

d. Other issues

Accountability must be considered in the scope and procedures section. All DG systems must provide monthly generation information regarding quantity of kW's produced and consumed. If a DG owner/operator sells electricity, the generator should be considered a business with proper licensing at city/state levels, and any applicable retail or wholesale sales taxes should be accounted for. "Net metering" could cause this export of electricity and the generator should be required to provide monthly generation statistics that will be reported publicly as with other water and power providers. This monthly reporting will be used as proof of a running generator and can be relied on by the utility as a resource for grid supplement

A provision for Authorized Installers is required. Installation of DG in any class should be done by a utility engineering company approved by ACC standards and certified by the State of Arizona as a DG installation, maintenance and operations contact point.

B. Rights and Responsibilities
a. Utility and applicant

The Utility Companies have provided a reasonable document for the establishment of service to customers who would like to consider DG on their property. The Utility Interconnection Requirements stop short at the legal responsibility of providing safety to employees and Utility equipment. An Interconnection Requirement for the DG side of responsibility has not been written.

The Utility Interconnection Requirements seem to try to limit Utility liability by insisting that Utility responsibility stop at a meter, breaker or other disconnect device (i.e., page 6, section 3 of the APS IR states, "APS will not assume any responsibility for the protection of the Customer's generator..."). The Utilities must rise to a higher level of cooperative partnership if the goal of DG is truly a benefit to the Utility.

The application process provided by the Utilities must be updated on a regular basis (every 2 years) in order to benefit by experience gained over time. Because detailed procedures that the DG industry must follow are not yet expressed in a document, a proposal or a manual, there is a large void in the DG anticipated rules and policies. Due to this "missing link", the first generation of DG installed over the first 10 years of the program must be installed by certified electrical/mechanical engineering companies, not just any electrician out of the yellow pages. The level of certification will qualify electrical/mechanical engineering companies that are known to have the expertise to evaluate utility grid systems before an application is submitted to the Utility. In order to ensure installation by a certified company, the DG owner should be required to submit a pre-proposal specifying the name of the engineering company before the interconnect plans begin.

The DG owner/operator should supply the ACC with copies of all appropriate city, county and state licenses and permits, and, where appropriate, Homeowner Association approval.

b. Easements/rights of way

Any DG must be accessible to Utility personnel or other inspectors. The DG must also be restricted from access by the public.

Utilities must make land in utility right of ways available for lease to DG systems.

c. Insurance

A general liability business insurance policy in the amount of \$1 million is the minimum insurance companies and regulators should accept as a standard. Actual insurance may be higher depending on the risk of exposure to the live grid system. DG from a residential zoning area may have restrictions to enter based on zoning. Some Homeowner Associations further restrict operations of a business, causing insurance to be unavailable.

d. Other issues

Access to Utility transmission, distribution and network drawings

The drawings for the transmission and distribution grids are proprietary information and should be kept under intellectual property nondisclosure agreements. Business plans that must be written by DG prospective businesses require access to these drawings in order to identify capabilities of the grid and the possible access points in the grid for DG. The most convenient interconnect points are at substations. First generation DG in the 2-50 mW range should be located at substation sites that have enough adjacent land to support DG equipment.

C. Definitions

The APS definitions plus the SRP definitions in the respective interconnection requirement guidelines should be used. A "Queue Position" definition as presented in the FERC manual would be helpful.

Certification Codes and Standards - All IEEE sections from all resources should be noted in the ACC manual. Attachment 3 in the FERC document is a good list.

D. Interconnection Process/Procedures

a. Procedures addressing both network and non-networked interconnections

APS currently has a prohibition on DG in a network. With time and experience, we should learn how to install safe network systems. APS's main network system is in large building areas downtown for protection and reliability of network power to high rise buildings. The DG industry would like to target government buildings as customers in these network systems. Some of these government buildings may soon have a mandate that requires 10% - 20% of the building's electric power come from renewable sources. Renewable DG can supply this power, but the generator would have to remain out of the network area.

b. Pre-interconnection study or screening criteria

A DG business plan must have a five year minimum forecast of financial and operations activities. In order to accomplish this, a business must have open

access to all grid wiring drawings and diagrams encompassing a list of components in the system and size ratings within the utility wiring systems including transmission and distribution systems. The Utilities must establish a confidential proprietary information, nondisclosure policy that will allow DG businesses to execute these studies. Each DG business may have a different business strategy so the nondisclosure will protect the DG business as well as the Utility.

c. Expedited processes for smaller generators

If someone has the desire to connect a small generator to the grid, the process must have all of the same business, safety, and financial risk analyses as a 2mW or a 200mW system. There are many faults in the small generator proposed strategy. The concept of "a million roofs" creates a million ways to disrupt reliability of the grid. Any connection to the grid will expose liability to a broad section of the grid, so all grid connect requirements have to be followed. Suppose Arizona adopted a "100,000 roof" mandate. The requirement of connecting 10,000 interconnections per year, for 10 years, would require 20 full time inspectors hired just for installation inspections. And chances are that the majority of these rooftop systems would never "run the meter backward". For homeowners with the desire to use self-generated power to lower their electric bill, the small generator should be on an isolated wiring system not allowed to connect to the grid. The small generator DG business should design products and appliances that have separate home wiring systems to power specific appliances, electronics or lighting, creating a demand side management system; the goal should not be to go into business with the Utility to sell minuscule amounts of power back to them. The selling of anything, including electricity, should require a business license. DSM, because it does not involve selling electricity, does not require a business license.

Another flaw in current DG strategy is the idea that anyone who wants to install a 50 kW electric generator on their residential zoned house should be allowed to do so. Homeowners insurance does not cover this type of business. Additionally, obtaining the required business liability insurance in a residential zoned property will, most likely, not be possible.

If 50 kW systems were allowed, the neighborhood electric system could possibly only handle one or two 50 kW systems before the wiring system reached peak capacity. Consequently, the next person to apply for a 50 kW system in the same neighborhood would be rejected unless he paid for a wiring upgrade for the entire neighborhood. This creates a "first come, first served" system that is inherently unfair and is certainly not conducive to solid business planning.

d. Communication process concerning proposed DG projects

The Utility interconnect guidelines are sufficient at this point in time. Regulation that forces schedules will not be effective. A business relationship between the DG business that wants to install generators and the Utility must be developed with a successful outcome in mind. Regulations cannot force a successful relationship. A DG business plan should speak the same language as the Utilities currently have in place. As long as all parties work in good faith through good business practices, successful projects can be proposed and built.

e. Equipment pre-certification

The utility formats are acceptable; IEEE is the leading specification for equipment.

f. Utility reporting requirements to the Commission

The DG must report all generation to the ACC. Advance notice on projects would be acceptable if confidentiality can be maintained by the ACC.

g. Utility inspections

The inspections described in the utility guidelines are adequate, no further regulation is needed.

h. Interconnection dispute resolution process

The utilities address a dispute process that is suitable at this time. In the future, further regulation may be required.

i. Disconnect from or reconnect with the grid procedure

The Utility guidelines are sufficient; the need for further regulation will surface with time and experience.

j. Other issues

E. Application Process and Document Requirements

a. Time periods for processing applications

The guidelines established by the Utilities are workable. Attempts to regulate the scheduling process will disturb business and safety processes that are still in the discovery stage. We should think of the next 10 years as the first generation of DG, with lessons learned that will help future regulation.

b. Steps in the process

- c. Documentation requirements
- d. Designation of utility contact persons
- e. Other issues

II. Interconnection Technical and Operational Requirements

The utilities have done a very good job in defining technical and operations requirements of DG. The current Utility documents provide the framework for the first generation of DG. The following topics, A-H, are covered sufficiently within the Utilities documents. The Utilities will need to update their interconnect manuals in accordance with any new ACC rules.

- A. Categories of equipment
- B. Design considerations/Protective equipment requirements
- C. Operational requirements
 - a. Voltage levels
 - b. Network & non-network items
- D. Inspection and start-up testing
- E. Testing and commissioning
- F. Meter installations
- G. Maintenance requirements
- H. Other issues

III. Other Considerations

- A. Net metering

The goal of DG is to provide a reliable source of power to the Utilities. The reliability of a generator is based on factual metering. The buy/sell meter creates a taxable event in the eyes of revenue departments of the government. Even the proposed "barter" system, where the customer causes the utility to bill less, creates a taxable event. Two meters will be preferred for accurate hourly monitoring of financial accounting issues connected with the sale of electricity through a DG system connected to the grid; one standard meter for electricity sold to the customer, and another meter that measures electricity flowing back into the grid.

- B. Other issues

The DG regulatory process is being reviewed to more fully understand technical, regulatory, and business planning methods. During this review a few challenges became obvious, and it is also clear that the Utilities have done a very good job addressing the DG issue. The unresolved issues lie mostly "on the other side of the meter", namely on the DG side of the meter. The Utilities have provided interconnection policies and procedures that are adequate at this point in time. Discussions with Utility representatives have shown that we agree that

amendments to the current interconnect manuals will be developed as time provides lessons in business development.

Looking at the DG industry from a current business perspective exposes many loose ends. Business planning requires research into profitability based on reliable data. Data sources are currently not available. Evolution of the DG industry will go through phases. We are only at the beginning of this process. Some ground rules must be in place to create a solid foundation for the first generation of DG to enter the marketplace. We want a true market to be developed, and much of the development should rely on industry solutions, with regulatory solutions put into place when necessary.

A DG market needs a central organization that disseminates information on the entire market. In Arizona, the ACC Utilities Division should be the central organization through the first generation of DG. Basically, the market needs a website that will give "real time" information on every generator in Arizona, including base load plant, peaking plants, and DG. The central information website should also provide "real time" loads in Arizona. This could be accomplished by metering the substations. Substations transfer electricity from high voltage transmission grids to distribution wiring. The meters at substations will give a true reading of total loads in Arizona. SRP has 208 substations in Arizona. These 208 substations, plus all of APS's substations, and every other substation in the State should be required to provide real time data to a central source managed by the ACC.

Another component of accurate data representation is the import and export of electricity in the State of Arizona. These high voltage transmission lines can be monitored fairly easy and, in fact, are already being monitored by individual utilities and grid transfer agencies.

A central source of reliable information is required for real business plans to be developed. This central information system should act only as a monitor, not as a clearing house for brokering electricity as in an Independent System Operator (ISO) situation. All sales and marketing of electricity should continue to be directed by industry as we do today. The transparency in the industry will be greatly enhanced by a central information system; planning of DG can subsequently be clearly understood and properly executed.

DG can be profitable, but it must be accomplished through normal business practices with the authority of ACC rules used as a guide for banking purposes. Investors will not invest, and banks will not provide loans to an industry that cannot provide reliable data on the market and that do not have governance rules supported by State and Federal law.

All decisions on DG must take into consideration the safety aspects of DG. The ACC must also help protect the financial integrity of the utilities keeping in mind

that nothing should be regulated that would adversely affect investor confidence in the Utilities.

DG can present potential problems in the event of a regional emergency that blacks out a portion of a grid. Emergency response units of the Utility must locate and shut off any DG that may have failed during a shutdown of a grid. We must anticipate that, during an emergency, there may be limited access to Utility DG tracking systems, therefore, it is recommended that all DG systems be fitted with a GPS transmitter tracking signal that allows emergency workers to locate the DG in the least amount of time.